CLAIMS

What is claimed is:

1. A loop thermosyphon system, comprising:

a semiconductor die having a plurality of microchannels;

a condenser in fluid communication with the microchannels; and

wicking structure to wick fluid between the condenser to the semiconductor.

2. The system of claim 1, further comprising an input fluid conduit for coupling fluid from the condenser to the semiconductor die, the wicking structure being internal to the input fluid conduit.

3. The system of claim 1, further comprising an input header, coupled with the semiconductor die, and an input fluid conduit, coupled between the condenser and the input header, the input fluid conduit and input header cooperating to couple fluid from the condenser to the microchannels, the wicking structure being internal to one or both of the input fluid conduit and the input header.

4. The system of claim 1, further comprising a plate coupled with the die to seal the microchannels such that fluid flows through the microchannels.

5. The system of claim 1, further comprising fluid selected from the group consisting of water, Fluorinert and alcohol.

6. The system of claim 1, further comprising an output fluid conduit, for coupling fluid from the microchannels to the condenser.

7. The system of claim 1, further comprising an output header, coupled with the semiconductor die, and an output fluid conduit, coupled between the output header and the condenser, the output header and output fluid conduit cooperating to couple heated fluid from the microchannels to the condenser.

8. The system of claim 1, the wicking structure comprising thermally conductive material.

9. The system of claim 8, the wicking structure comprising copper.

10. The system of claim 8, the wicking structure being selected from the group comprising porous-like material, powder, fiber, screen and mixtures thereof.

11. The system of claim 1, the wicking structure being selected from the group comprising porous-like material, powder, fiber, screen and mixtures thereof.

12. The system of claim 1, the microchannels being shaped for preferential fluid flow along one direction of the microchannels.

13. The system of claim 1, further comprising blocking material forming at least one orifice at an input to at least one of the microchannels, for preferential fluid flow along one direction of the one microchannel.

14. The system of claim 13, the blocking material comprising one of metal and plastic.

15. The system of claim 1, the condenser being constructed and arranged above the die, wherein gravity forces cooler condenser fluid towards the die.

16. The system of claim 1, further comprising fluid-flow restrictive material at an input to at least one of the microchannels, for preferential fluid flow along one direction of the one microchannel.

17. The system of claim 16, the fluid-flow restrictive material comprising one of a screen, non-metal porous material, metal porous material, scintered copper and metal matrix.

18. A loop thermosyphon system, comprising:

a semiconductor die having a plurality of microchannels, one or more of the microchannels being shaped for preferential fluid flow along one direction of the die; and

a condenser in fluid communication with the microchannels, to cool heated fluid from the die for input to the microchannels.

19. The system of claim 18, further comprising wicking structure arranged between the condenser and the die, to wick fluid from the condenser to the microchannels.

20. A loop thermosyphon system, comprising:

a semiconductor die having a plurality of microchannels;

at least one orifice at an input to at least one of the microchannels, for preferential fluid flow along one direction of the at least one microchannel; and

a condenser in fluid communication with the microchannels, to cool heated fluid from the die for input to the microchannels.

21. The system of claim 20, further comprising wicking structure arranged between the condenser and the die, to wick fluid from the condenser to the microchannels.

22. A method of cooling a semiconductor die, comprising:

wicking fluid from a condenser, for input to one or more microchannels of a semiconductor die;

communicating heated fluid from the die to the condenser; and

cooling fluid at the condenser.

23. The method of claim 22, the step of wicking comprising utilizing an input fluid conduit, containing the wicking structure, between the condenser and the semiconductor die.

24. The method of claim 23, the step of wicking comprising utilizing an input header, containing the wicking structure, between the input fluid conduit and the microchannels.

25. The method of claim 22, further comprising the step of shaping the microchannels for preferential fluid flow along the microchannels.

26. The method of claim 22, further comprising the step of forming an orifice at an input to one or more of the microchannels, for preferential fluid flow along the one or more microchannels.

27. The method of claim 22, further comprising the step of placing fluid-flow restrictive material at an input to one or more of the microchannels, for preferential fluid flow along the one or more microchannels.

28. A loop thermosyphon system, comprising:

a semiconductor die having a plurality of microchannels;

fluid-flow restrictive material at an input to at least one of the microchannels, for preferential fluid flow along one direction of the at least one microchannel; and

a condenser in fluid communication with the microchannels, to cool heated fluid from the die for input to the microchannels.

29. The system of claim 28, the fluid-flow restrictive material comprising one of a screen, non-metal porous material, metal porous material, metal matrix and scintered copper.